# **20-Need For Inheritance**

#### Inheritance in Java

# **Object-Oriented Programming (OOP):**

When discussing Object-Oriented Programming (OOP), concepts like classes, objects, and encapsulation are fundamental. One of the most important concepts within OOP is **inheritance**.

## The Need for Inheritance

## Understanding "Is-A" and "Has-A" Relationships:

# • Has-A Relationship:

Consider a computer as an abstract concept. It could be a laptop, desktop, or mobile device—it's not specific, just a hardware device. When discussing a desktop, for example, we might say that the desktop *has* hardware, *has* a keyboard, and *has* a mouse. These relationships describe composition, where an object contains other objects.

## • Is-A Relationship:

Now, take the example of a Toyota Fortuner, a popular car in India. When referring to it, we say "Fortuner is a Car." The phrase "is a" emphasizes the relationship of inheritance. Here, the Fortuner inherits the general characteristics of a car but also includes specific features that distinguish it from other cars.

# Real-World Example of Inheritance

In Java, inheritance is a mechanism where one class can inherit properties and methods from another class. Let's consider the example of a calculator:

#### • Basic Calculator (Calc):

This class might include variables and methods for basic operations like addition, subtraction, and division.

#### • Advanced Calculator (AdvCalc):

This class represents a scientific calculator with advanced features, in addition to the basic operations.

## **Inheritance Relationship:**

AdvCalc *inherits* from Calc. This means AdvCalc can use the properties and methods
of Calc and add its own specialized features.

## **Key Terms in Inheritance**



# • Parent Class / Superclass / Base Class:

The class from which properties and methods are inherited. In this example, Calc is the parent class.

### • Child Class / Subclass / Derived Class:

The class that inherits from another class. Here, AdvCalc is the child class.

# • Inheritance and the extends Keyword in Java

• In Java, inheritance is implemented using the **extends** keyword. This keyword allows one class (the child class or subclass) to inherit the properties and methods of another class (the parent class or superclass).

## Syntax:

```
class ParentClass {
    // Fields and methods
}

class ChildClass extends ParentClass {
    // Fields and methods specific to ChildClass
}
```

